Instructions to Authors

*Molecular Biology and Evolution (MBE)* is devoted to the interdisciplinary science between molecular biology and evolutionary biology. *MBE* emphasizes experimental papers, but theoretical papers are also published if they have a solid biological basis. Although this journal is primarily for original papers, review articles and book reviews are also published.

Submission of Manuscripts

Send one original and two high-quality copies of the manuscript to the editorial office (Molecular Biology and Evolution Editorial Office, Biology Department, Hutchinson Hall, University of Rochester, Rochester, NY 14627, USA). Proposals for review articles and book reviews must be discussed with the editor prior to submission. Any manuscript or any part of a manuscript that has been published or submitted for publication elsewhere cannot be accepted for publication. The electronic posting of a manuscript (i.e., on the World Wide Web or other network venue) by any author or co-author before the date of the *MBE* issue in which it is to appear constitutes prior publication, and will result in its immediate withdrawal from further consideration and/or publication.

Authors may also send manuscripts of original research articles only directly to associate editors (see inside back cover of journal for list of associate editors). To avoid unnecessary delays authors should contact that associate editor prior to sending the manuscript. At the same time that the manuscript is mailed, authors should notify the editorial office of the title, authors, contact information for the corresponding author, and the name of the associate editor. E-mail, fax, or regular mail are acceptable for such notifications. That notification will permit us to ensure that manuscripts are handled promptly and will prevent undue delays in the event that a manuscript is lost in the mail.

In either case, if an author has not received an acknowledgment of the manuscript within 10 days after sending it, the editorial office should be contacted immediately.

Reviewers occasionally request sequences from authors to verify claimed results; thus, associate editors may request authors to submit sequences on a diskette. The format for such submissions will be discussed at the time of the request. Please do not include diskettes with original submissions.

Decisions on acceptance of papers will be made as rapidly as possible. Papers that are not suitable to the journal will be returned immediately to authors without detailed review.

After a manuscript is accepted, the corresponding author will be required to sign an agreement transferring copyright to the Society for Molecular Biology and Evolution. No published material may be reproduced or published elsewhere without the written permission of the copyright owner.

The journal will not be responsible for the loss of manuscripts at any time.

Publication is taken to imply that the authors are prepared to make available to the public, at reasonable cost, any strain, clone of cells, or plasmid DNA used in reported experiments, and any public-domain computer programs on which the paper is based. Nucleic acid and protein sequences must be submitted to GenBank or other national database in computer-readable format along with the appropriate associated data. The GenBank or other accession number will be printed in the article at the first mention of the sequence.

Electronic Submission on Computer Disk

Authors are strongly encouraged to include electronic versions of REVISED VERSIONS of manuscripts on 3.5inch computer disks that have been formatted either for Macintosh or DOS, and with files in whatever word-processing format that is preferred. Disks should be labeled with this formatting information. Electronic versions speed the publishing process and reduce the probability of printer errors. Page charges will be reduced $5 for final versions submitted with a disk, and page charges will not normally be waived unless a disk version of the manuscript is provided. Because manuscripts are immediately sent to the printer upon acceptance by the editor, it is important for authors to provide disk versions at each stage of revision. Please do NOT, however, include disk versions when manuscripts are originally submitted. Authors MUST provide hard-copy versions of manuscripts along with electronic versions. Disks will not be returned to authors.

Preparation of Manuscripts

In these instructions the word “must” indicates that the paper will not be published if the manuscript does not conform to that instruction. The word “should” means that the editors strongly urge compliance with that instruction, but that compliance is not a condition of publication.

Papers must be written in English and organized in the sequence described below. Each section, including tables and figure legends, must be typed double-spaced on heavy-weight, nonerasable bond; the page margins must be at least 32 mm (1.25 inches) wide on the left and 25 mm (1.0 inches) wide on the right. Type must
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not be smaller than 12-point Times Roman; there must not be more than 3 double-spaced lines per inch (24-point spacing); and right-hand margins must not be justified. Word-processing output on dot matrix printers is acceptable only if it is the quality of the standard typewriter.

Handwritten items (e.g., Greek letters) must be identified in the margin. Non-English words must have correct diacritics. Each major part of the paper (Abstract, Main Text, Literature Cited, Tables, Figure Legends) must begin on a new page, and the pages must be numbered consecutively throughout, beginning with the title page and continuing through the abstract, text, acknowledgments, appendix, literature cited, tables, and figure legends. Manuscripts must be assembled so that figures appear last.

Brief communications may be published as “Letters to the Editor.” Instructions for preparation of “Letters” can be found after the instructions for preparation of regular manuscripts.

Title Page

This page must contain:

- paper’s title
- names of all authors
- institution(s) at which the research was done
- current affiliations of all authors
- name and address, telephone number, fax number, and e-mail address of the corresponding author
- list of key words (see below)
- running head (maximum of 50 characters and spaces)
- list of nonstandard abbreviations used, if any (see below)

Authors should choose titles for maximum information content, rather than for dramatic impact. Keep in mind that the use of electronic databases to retrieve relevant literature is increasing rapidly. Appropriate titles that include the key words and phrases which describe the content will ensure that your work reaches the widest possible audience.

Key Words

A list of three to six words or phrases that will accurately index the subject matter of the article should be provided. Many databases index key words and titles separately; thus, it is important to include among the key words those essential words that also appear in the title. The name of the organism used should always be among the key words. Judicious choice of key words will maximize the number of people who read your paper.

Abstract

The abstract should be a factual condensation of the entire paper, including a statement of purpose, a clear description of observations and findings, and a concise presentation of conclusions. The abstract must not exceed 350 words (one double-spaced page). It should not assert that the findings are discussed. References to cited literature should be minimized.

Main Text

The main text should comprise the following sections: (1) Introduction, (2) Materials and Methods, (3) Results, (4) Discussion, and (5) Acknowledgments (if any). Results and Discussion may be combined into one section, and a Conclusions section may be included if desired. Papers must be concise but will not be restricted in length.

All organisms mentioned must be identified by their scientific binomens and underlined or italicized. Abbreviations for taxa, where reasonable, should be of the form “Gsp” (Genus, species) as, for example, “Hsa” for Homo sapiens. Symbols for genetic loci must also be italicized or underlined and must follow the established rules of genetic nomenclature that have been established for the various organisms. Include the formal IUBMB (International Union of Biochemistry and Molecular Biology) name and number of all enzymes that are discussed.

Abbreviations used by the Journal of Biological Chemistry will be regarded as standard. Nonstandard abbreviations must be defined at first occurrence, both in the abstract and in the main text. Authors may also include a list of their nonstandard abbreviations on the title page of the manuscript. This list would appear on the first page of the published article above the list of key words. The abbreviations Myr for “million years” and MYA for “million years ago” will be considered standard.

Mathematical equations must be carefully type-written or printed; spacing between characters must be correct as typed. It will be assumed that all characters in equations and their counterparts in the text will be set in italics unless the author specifies otherwise the first time a character appears. Equations must be numbered sequentially, in arabic numerals in parentheses, on the right-hand side of the page. These and other guidelines can be found in the Council of Biology Editors Style Manual (6th ed., 1994). In general, all material should conform to that manual’s format. Also, consult recent issues of this journal.

Terminology

A satisfactory interdisciplinary communication requires using words with careful attention to their precise
meaning in both disciplines. Authors may use any word they choose provided only that its meaning is clear and consistent and serves to increase the paper's comprehensibility. The following preferred usages will be assumed unless authors define them otherwise.

Where the alignments disagree, they are differences rather than changes, since there may have been multiple changes to create a single difference. The word “invariant” has two common but different meanings, invariable and unvaried. Be sure that the meaning is clear. Use of the term “mutations” should be restricted to changes before selection has operated. If two molecules are alike in some degree, they are similar. If you infer from their similarity that they have a common ancestor, then they are homologous, but if their similarity was acquired by convergence, they are analogous. When homology arises via a gene duplication (all or part), it is paralogy; when it arises via speciation, it is orthology; when it arises by horizontal gene transfer, it is xenology. The phrase “insertions and/or deletions” may be reduced to “indels.” Gaps are introduced into sequences to increase their similarity rather than to optimize similarity, unless an algorithm is employed that guarantees an optimized result according to the way similarity is defined (e.g., as maximum matches). Similarity should not be asserted to be significant unless patently obvious or accompanied by a probability statement and its method of determination ($\chi^2$, standard measure, binomial, etc.).

Trees determined by methods that can produce branch lengths should have those lengths placed upon them. Bootstrapping is encouraged, and those numbers should be placed on the tree also. An alternative to bootstrapping is the provision, on the tree, of the estimated standard error of each branch’s length. If more than one tree is obtained for the same taxa, rotations about ancestral nodes should be done so as to make the order of the taxa agree as much as possible with each other. If there is a table of distances or a set of aligned sequences, the order of the taxa should also match that of one of the trees obtained from them.

The IUBMB single-letter code for nucleotide bases including ambiguity is as follows: A = adenine; C = cytosine; G = guanine; T = thymine; U = uracil; R = A/G (purine); Y = C/T (pyrimidine); M = A/C; W = A/T; S = C/G; K = G/T; B = C/G/T (not A); D = A/ G/T (not C); H = A/C/T (not G); V = A/C/G (not T); and N = X = A/C/G/T (any or unknown). For ambiguous nucleotides, T and U are equivalent.

**Data Sequences**

We encourage the production of high-quality, accurate DNA sequences but also recognize the inherent trade-offs between amount and accuracy of DNA sequence and that certain situations demand higher levels of accuracy than others. Among the measures that should be considered in producing accurate sequences are sequencing both strands fully, minimizing the length of each primer read, controlling for PCR misincorporation when sequencing cloned PCR products, and instituting rigorous quality control procedures to reduce clerical errors in reading, transcribing, and communicating nucleotide sequences. Determining the sequence on both strands for at least 80–90% of any given sequence is the standard for most studies. When only one strand is sequenced, this must be explicitly stated both in Materials and Methods and in the entry that is submitted to one of the sequence databases.

Perhaps the most common circumstance in which it may be appropriate to sequence one strand occurs when a number of sequences from within a species, or from a set of closely related taxa, are being compared. In such cases, a method such as that described in Nachman et al. (1994), Genetics 136: 1105-120, fig. 3, should be employed to ensure that all differences are detected.

Whenever a single strand is sequenced, the burden is entirely upon the authors to convince the associate editor and reviewers that the quality of the data is adequate and that the purpose and nature of the analysis justify sequencing only one strand. An associate editor may, at her or his discretion, always insist that both strands are sequenced.

All ambiguous positions in a DNA sequence must be indicated with the appropriate IUBMB single-letter code (see “Terminology” above). Where ambiguities arise that the authors are unable to resolve, these should be so marked rather than “resolved” by guesswork.

**Literature Cited**

References within the text must be cited by author and year and, where citation is to a book, the relevant pages must be cited. Text citations of two or more works at a time must be given in chronological order; if two or more works have the same year of publication, they must be given in alphabetical order. When a paper written by three or fewer authors is cited, give the names of all authors (e.g., Barry, Jeffreys, and Scott 1981). If four or more authors have written a paper, give the name of the first author plus “et al.”

The Literature Cited section at the end of the paper must be arranged alphabetically by author(s) and then chronologically, and must contain only works specifically cited in the text. References to papers that have not yet been published will be as for articles (see below), except that “in press” (along with the journal name) will replace the volume and page numbers. At the proof-review stage, the corresponding author will provide publication information (e.g., volume, page numbers), if
available. If you cite an “in press” paper whose content is important to understanding your manuscript, you should include three copies of that paper along with your manuscript to help the reviewers.

Manuscripts that have been formally accepted for publication can be listed in Literature Cited; submitted manuscripts cannot. Work that is in submitted manuscripts should be cited in the text as “unpublished data,” when it is by one or more of the authors of the paper considered for publication in MBE. For instance, work by W. Gilbert, D. Sullivan, R. Rogers, and 0. Hammerstein will simply be given as “unpublished data” (no names included), if 0. Hammerstein is an author of the MBE paper. If, on the other hand, the submitted manuscript is the work of others, one of those authors must be contacted to obtain permission to cite the results, and the citation should be written as “name of author contacted, personal communication.” Thus, for a submitted manuscript authored by R. Jones and G. Bartlett, the citation should read “R. Jones, personal communication.” if permission was granted by Jones.

For the style of references, please note the following examples:


**Books:** INGRAM, V. M. 1963. The hemoglobins in genetics and evolution. Columbia University Press, New York. (The pages of the book that are appropriate must be given where the book is cited in the text.)


The abbreviations of periodicals must be those used in Chemical Abstracts.

**Footnotes**

Textual footnotes are not to be used. Footnotes to tables are referenced by superscript letters, except for significance levels, which use asterisks. Table footnotes must be typed beneath the table to which they pertain.

<table>
<thead>
<tr>
<th>Width of femur is measured at the widest point proximal to the acetabulum.</th>
<th>Width of femur is measured at the widest point proximal to the acetabulum.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table 1</strong> Relationship of Length and Width of Humerus and Femur to Cranial Circumference in 5 Editor Species at 1 Year and 5 Years after Becoming Editor</td>
<td><strong>Table 1</strong> Relationship of Length and Width of Humerus and Femur to Cranial Circumference in 5 Editor Species at 1 Year and 5 Years after Becoming Editor</td>
</tr>
<tr>
<td><strong>HUMERUS</strong></td>
<td><strong>FEMUR</strong></td>
</tr>
<tr>
<td>Length (cm)</td>
<td>Width (cm)</td>
</tr>
<tr>
<td>Picky editor</td>
<td></td>
</tr>
<tr>
<td>1 yr</td>
<td>0.27</td>
</tr>
<tr>
<td>5 yr</td>
<td>0.25</td>
</tr>
<tr>
<td>Unreasonable editor</td>
<td></td>
</tr>
<tr>
<td>1 yr</td>
<td>0.33</td>
</tr>
<tr>
<td>5 yr</td>
<td>0.36</td>
</tr>
<tr>
<td>Ferocious editor</td>
<td></td>
</tr>
<tr>
<td>1 yr</td>
<td>0.29</td>
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<tr>
<td>5 yr</td>
<td>0.38</td>
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<tr>
<td>Overbearing editor</td>
<td></td>
</tr>
<tr>
<td>1 yr</td>
<td>0.28</td>
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<tr>
<td>5 yr</td>
<td>0.23</td>
</tr>
<tr>
<td>Sweet and gentle editor</td>
<td></td>
</tr>
<tr>
<td>1 yr</td>
<td>0.28</td>
</tr>
<tr>
<td>5 yr</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Notes:**

a Width of humerus is measured at the widest point proximal to the scapula.

b Width of femur is measured at the widest point proximal to the acetabulum.

c Data unavailable, because no sweet and gentle editor could be detected 5 years after becoming editorship.

**Tables**

Each table MUST begin on a separate page although each may continue onto a second or third page, if necessary and MUST BE DOUBLE-SPACED. Also, each table must be set in a font equivalent to 12-point Times Roman type. Vertical rules MUST NOT be used. Tables are numbered with Arabic numerals, and each table must have a title that describes the content of the table. Data must be arranged so that columns of like material read down, not across. The heading should be sufficiently clear so that the meaning of the data will be clear without reference to the text. To conserve space, abbreviations should be used in tables. Tables do not have “legends”; instead, all explanatory material must be included within the footnotes that appear, DOUBLE-SPACED, immediately below the table. Explanatory footnotes must be indicated by superscripted lowercase letters but must not include detailed descriptions of experiments. Tables must include enough information to warrant table format; those with fewer than six pieces of data must be incorporated into the text. Please refer to the example table.

**Figure Legends**

Figure legends must be typed, DOUBLE-SPACED, on a separate page at the end of the manuscript, after
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Figures (Illustrations)

Each figure should be a high-quality, camera-ready original, not a photocopy. Each figure must be on a separate page and must have a uniform lettering style. When a figure has more than one part (e.g., Fig. 1A, Fig. 1B), those parts should appear together on a single page whenever possible. If you present a multipart figure in which the parts are designated “A,” “B,” “C,” etc., the lettering indicating those parts must be part of the figure itself. (Typesetters cannot add that feature to figures.) Figures must be numbered consecutively, following the sequence in which they are mentioned in the text. The name(s) of the author(s), the figure number, and an arrow indicating proper orientation should be printed well away from the figure itself, or written lightly in pencil on the back of each figure.

Line drawings must be of high quality; typewritten or hand lettering is unacceptable. Text and lines must be of a size and thickness that will withstand reduction to fit MBE page formats. To conserve space, figures will be reduced to fit one column whenever possible. The necessary reduction can easily lead to loss of important detail; for example, dashed lines become solid, white space within letters is lost so that a “c” is indistinguishable from an “o.” To determine whether your figure will stand such reduction, it is helpful to print computer-generated figures at either a single column width (maximum width = 82 mm [3 inches]) or a double column width (maximum width = 168 mm [6.5 inches]). Maximum length of printed figures is 224 mm (8.75 inches). Please allow space for the figure legend. If the details of the reduced figures are unclear (lines, lettering, etc. too small) please make suitable adjustments. We find that clarity is usually impaired if, after reduction, capital letters and numbers are less than 2 mm high. Many photocopiers machines have a reduction option which will be helpful in assuring that figures will be clear when reduced.

Photographs must be high-contrast, glossy prints. Magnifications may be indicated either by a micron bar or in the legend.

Sequences and alignments must not exceed two pages when published. As for other figures, sequence alignments must also be camera-ready copy and must be able to withstand reduction as described above. In particular, it is important to ensure that all of the characters retain their clarity when reduced to fit the journal page. Alignments may be submitted to EMBL, and an alignment number may be obtained, which we will publish in the article. Dot matrices and hydropathy plots are rarely accepted. Color illustrations are acceptable but will incur a charge. If you wish to include a color illustration, send a copy to the Editorial Office and we will obtain a quote from Allen Press. Charges for color illustrations cannot be waived, nor will page charges be waived for manuscripts that include color illustrations.

Letters to the Editor

Short communications may be published as “Letters to the Editor.” Letters may contain no more than one figure and one table, OR two figures, OR two tables; the text is limited to eight manuscript pages, including Literature Cited and any table(s). Letters do not include an abstract and are not generally divided into sections, but all other instructions for preparation of manuscripts apply to letters. The criteria for acceptance of letters are identical to the criteria for the acceptance of regular papers; that is, the distinction between regular papers and letters is length, not content. Letters must contain new and previously unpublished information. Letters that contain only opinion, commentary, and discussion will not be accepted.

Proofs and Reprints

Offprint order forms will be sent to the author (or, in the case of multiple authors, to the corresponding author) with page proofs.

Page Charges

There is a charge of $35 per page or fraction of a page for the first 10 pages for publication in MBE. For each page over 10, the charge will be $55 per page. These charges will be reduced to $30 per page (and $50 for pages in excess of 10) for final versions that are submitted with a disk. Please use the following method to estimate the number of journal pages that the manuscript will require: (Text pages include title page, abstract, main text, literature cited, any appendices, all table pages, and figure legends.) Any portion of a page counts as a full page.

Journal pages = (0.3 X text pages) + (0.44 X number of figures) - (0.15 X number of tables)

If the authors do not have the financial resources to cover these charges, a waiver of the charges may be requested of the editor at the time that a manuscript is officially accepted for publication by the editor. (Authors will receive a formal letter of acceptance from the editorial office.) Page charges will not be waived for pages over 10.

Page charges will not normally be waived unless an electronic version of the manuscript accompanies the
The Review Process and Communication with Editors

**MBE strives** to minimize the time required for reviewing and processing manuscripts. You should always receive a letter acknowledging receipt of your manuscript. If you have not received such an acknowledgment within 10 days of sending your manuscript, please contact the editorial office immediately. We try to complete the initial review process within 6 weeks. If your manuscript has not been returned within 8 weeks, please contact the editorial office. Prompt inquiries about the status of your manuscript will help to avoid delays, especially on those rare occasions when manuscripts are lost in the mail. Such enquiries should be directed to the editorial office by phone: (716) 275-3468, by fax: (716) 275-2070, or by e-mail: mbe@mbi.biology.rochester.edu.

If, at any time, you are dissatisfied with any aspect of the handling of your manuscript, or if you have any suggestions that might improve our performance, please contact the editor directly (phone: (716) 275-0721, fax: (716) 2752070, or by e-mail: bhall@bgh.biology.rochester.edu).

General Advice to Authors

Your goal is to help the reader understand what you have done. Try to keep the mythical average reader in mind as you are writing, and do everything that will help that person both follow and appreciate what you have done. Keep jargon to an absolute minimum. Remember that the **MBE** audience includes evolutionary biologists who have minimal familiarity with molecular biology and its language, and molecular biologists who have minimal familiarity with evolution and its language. If you use a term such as “introgression,” tell the reader, in a few words, what introgression means. If you label a portion of a sequence as a “Shine-Dalgarno” sequence, tell the reader that you mean a ribosome binding site.

Length: Although there is no set maximum length for articles, it is necessary to be concise. Tell the readers exactly what they need to know in order to understand what you have done and where it fits into the general body of the field. Do not tell them anything else, no matter how interesting it may be or how much that particular tidbit may enrich their lives. Remember, excessive length costs you additional page charges! Excessive verbiage is the single most common fault that must be corrected during revision. Excessive referencing should be avoided. Cite that literature which you consider to be important to the readers and especially relevant to the material in your paper, but do not try to provide exhaustive references to every possible publication that might be related to the particular point. An effective way to avoid excessive referencing is to make it clear that you are citing examples, not all of the work pertinent to the point you are making. When the Literature Cited section begins to approach 20% of the length of the text, you should consider which references might not really be necessary.

Title and key words: Your choice of title and key words will, to a large extent, determine the number of people (outside of regular readers of **MBE**) who read your paper. More and more people rely upon automatic electronic searches of databases to find the literature they seek. Cute titles (“The Universe: Part 1”) will grab the attention of those who are physically reading that particular issue but will not be recovered in a search. The best guard against your valuable and important contribution fading into obscurity is to choose titles and key words that accurately reflect the content.

Introduction: Provide sufficient background for the reader to understand what follows, but avoid the temptation to do a literature review. Do not try to summarize the conclusions of your study in the introduction, but do make very clear exactly what questions you are addressing. By the end of the introduction you should have opened the door into your study and given the reader the confidence to go through that door.

Materials and methods: If understanding a method is important to following (or to accepting) your results, it is important to provide a brief description of the method, even if it has previously been published. In those circumstances, rather than say, “The rate of **mRNA** synthesis was estimated as described in Smith and Jones (1989),” it is better to say, “The rate of **mRNA** synthesis was estimated from the rate of incorporation of $^{32p}$ labeled UTP into acid precipitable material as described in Smith and Jones (1989).”

Results and discussion: The separation of results from discussion of those results is often awkward and arbitrary. If you need to discuss the interpretation of a result in order for the reader to understand the next experiment that you present, by all means do so. Clarity, not form, should be the primary consideration.

Conclusions and speculations: It is important to tell the reader what you conclude from your data, but it is equally important to tell your reader if there are alternative conclusions that might be drawn and to explain why you prefer your conclusion. Similarly, it is often valuable to speculate, especially when there is insufficient data to draw a conclusion about a particular point.
Speculations, however, must be labeled as such in order to distinguish them from conclusions for the reader who is unfamiliar with your area.

**Figures and tables:** Use both judiciously. Do not include a figure when the contents of that figure can be described effectively in a couple of sentences; for example, a figure showing a four-taxon tree, when the tree itself is not the subject of the paper. On the other hand, do not describe at length in the text that which is apparent from examination of a figure. Similarly, do not restate in text that which appears in tables, and do not include two-line, two-column tables when their contents can easily be described in the text.